

**National Park Service
U.S. Department of the Interior**

**BRYCE CANYON NATIONAL PARK
UTAH**



FIRE MANAGEMENT PLAN

Environmental Assessment/Assessment of Effect

November 2004

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Fire Management Plan and Environmental Assessment

BRYCE CANYON NATIONAL PARK

SUMMARY

The National Park Service (NPS) proposes to develop a new Fire Management Plan for Bryce Canyon National Park, Utah. The plan would guide the wildland fire program by providing management direction that would support the accomplishment of resource management and protection objectives.

Fuel loadings and vegetation densities have increased in some areas beyond their range of natural variability. Some park developed areas, adjacent public developed areas and adjacent federal lands are now at risk. Increased management intervention is required to reduce fuels that, under severe burning conditions, could threaten life and property, and to restore the role of fire as a natural disturbance across the Bryce Canyon National Park landscape.

The current 1994 fire plan permits prescribed fires to meet resource objectives, as well as limited manual hazardous fuels treatments involving cutting and thinning to establish defensible space around values to be protected. All wildland fires are currently suppressed.

The revised Fire Management Plan would provide strategies that include suppression of unwanted wildland fires, expanding opportunities for increasing the use of prescribed fire to meet resource objectives and improving fuel reduction treatments (mechanical fuel reduction and prescribed fire) that would enhance defensibility around structures.

The fire management plan that will be developed from this environmental assessment will be an interagency plan with the USFS. The Fire Management Plan (FMP) provides a framework for joint management of wildland and prescribed fire as tools to safely accomplish both resource protection and resource management objectives on USFS and NPS lands. The lands include those administered by Bryce Canyon National Park, Cedar Breaks National Monument, Powell and Cedar City Ranger Districts, Dixie National Forest in southern Utah. The (FMP) is an Appendix to Bryce Canyon National Park's and Cedar Breaks Resource Management Plan (RMP) and a supplement to the Dixie National Forest's Land and Resource Management Plan (LRMP). This environmental assessment is just for lands administered by Bryce Canyon National Park.

Two alternatives, a no-action and a proposed action/preferred alternative, were identified based on program goals and objectives; internal and external scoping; guidance from existing park plans; policy guidance from the NPS; the 2001 Federal Fire Policy; the National Fire Plan; and research, monitoring, and experience from the existing fire management program.

Alternative A (No Action): Current fire management calls for suppression of all wildland fires throughout the park. Fire is considered an unacceptable risk. Fuel loading and ladderling can present a problem to fire suppression efforts, so strategies such as firebreak construction,

prescribed fire, and mechanical thinning (in wildland urban interface areas only) are employed as necessary to reduce fuel hazards throughout the park. Prescribed fire may be used to reduce fuels, discourage exotic species, or otherwise fulfill resource management or research objectives.

Alternative B (Proposed Action/NPS Preferred Alternative): The proposed action would allow for implementation of the full range of fire management activities, including wildland fire use and fuels management. Wildland fire activities would include suppression and use of wildland fire for resource benefit. Fuels management activities would include prescribed fire, and mechanical and herbicide treatments. The main focus of these activities and treatments as currently emphasized by national policy is public and firefighter safety, communities identified as at risk from wildland fires (wildland urban interface), historic fire regime, current condition class, and collaboration with other agencies and stakeholders.

NOTE TO REVIEWERS AND RESPONDENTS

This environmental assessment is available on the Bryce Canyon National Park Internet Web site at <http://www.nps.gov/brca/> and is being distributed for public and agency review and comment for a period of 30 days in accordance with the National Environmental Policy Act. If you wish to comment on the environmental assessment, you may mail comments to the name and address below.

Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home address from the record, which we will honor to the extent allowable by law. **If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.** We will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety.

Please send comments by December 24, 2004 to:

**Superintendent
Attn: Fire Management Plan/EA
Bryce Canyon National Park
P.O. Box 170001
Bryce Canyon, UT 84717**

**Or email: brca_superintendent@nps.gov
Subject: Fire Management Plan/EA**

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INTRODUCTION

Purpose and Need

The purpose of fire management planning at Bryce Canyon National Park (hereafter “Bryce Canyon” or “the park”) is to protect and conserve the natural and cultural resources of the park for the enjoyment of present and future generations. This includes perpetuation of the ecosystem in which these resources occur. Fire management is a tool used to maintain and/or restore ecological integrity. Fire management is also intended to protect human life and property, both public and private.

Historically, fire has played an important role in the ecological development of the landscape we know today in and around Bryce Canyon. Naturally occurring fire on this landscape periodically and, in most vegetation types, frequently thinned vegetation. These naturally occurring fires reduced and maintained fuel loads at low levels, such that most ignitions had few long-term adverse impacts. Over time, continued suppression of natural fire has resulted in the accumulation of fuels, creating potentially hazardous conditions that threaten human lives and personal property. These conditions also threaten the natural functions of healthy ecosystems by altering natural vegetation.

The current Fire Management Plan (FMP) was revised in 1994. In that planning effort, the National Park Service (NPS) identified management options that included prescribed fire and fire suppression. However, our understanding and management of fire has evolved over time, recognizing the role of fire in sustaining healthy ecosystems. Therefore, a new FMP is needed to implement new NPS policies developed from these experiences. Priorities within the new policy focus first on the protection of human life. The second priority focuses equally on the protection of resource values and property. This new policy provides direction for park managers to use fire as a tool in maintaining natural processes and vegetation community structure.

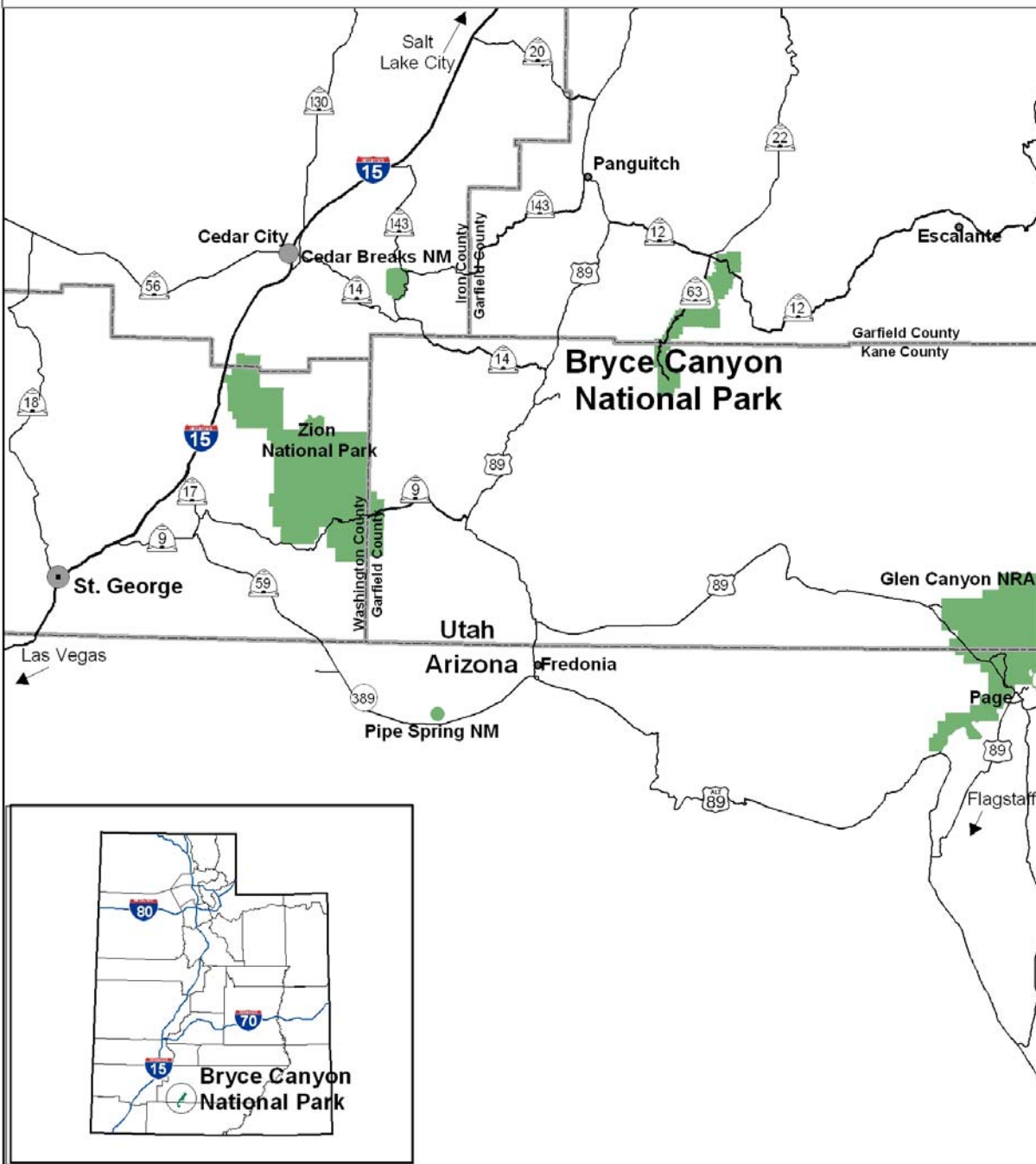
Location and Description

Bryce Canyon National Park is located on the western edge of the Colorado Plateau (Refer to Map A). The park lies in portions of two counties in Utah — Garfield and Kane Counties. The entrance of the park is approximately 210 miles southeast of Salt Lake City, Utah.

The park is located on the southeast escarpment of the Paunsaugunt Plateau where the plateau breaks abruptly to the east and south in a series of steep walls and slopes. The park is composed of numerous natural amphitheaters cut into the Pink Cliffs formation on this eastern side of the plateau. There is great contrast between the colorful lowlands along the eastern flank of the park and timbered hillsides and tablelands to the west. Elevations range from 6,580 feet to 9,115 feet above sea level.

Most of the land surrounding Bryce Canyon National Park is federally owned and managed by the U.S. Forest Service (USFS) as part of the Powell Ranger District of Dixie National Forest. The Bureau of Land Management (BLM) manages land along the northern and northeastern park boundaries. Remaining land in the area is owned by the State of Utah and private landowners (Map B).

Map A: General Location



Projection: Transverse Mercator
UTM Coordinate System, Zone 12
Datum: NAD 1983

Map Produced By
Bryce Canyon NP
Fire Management



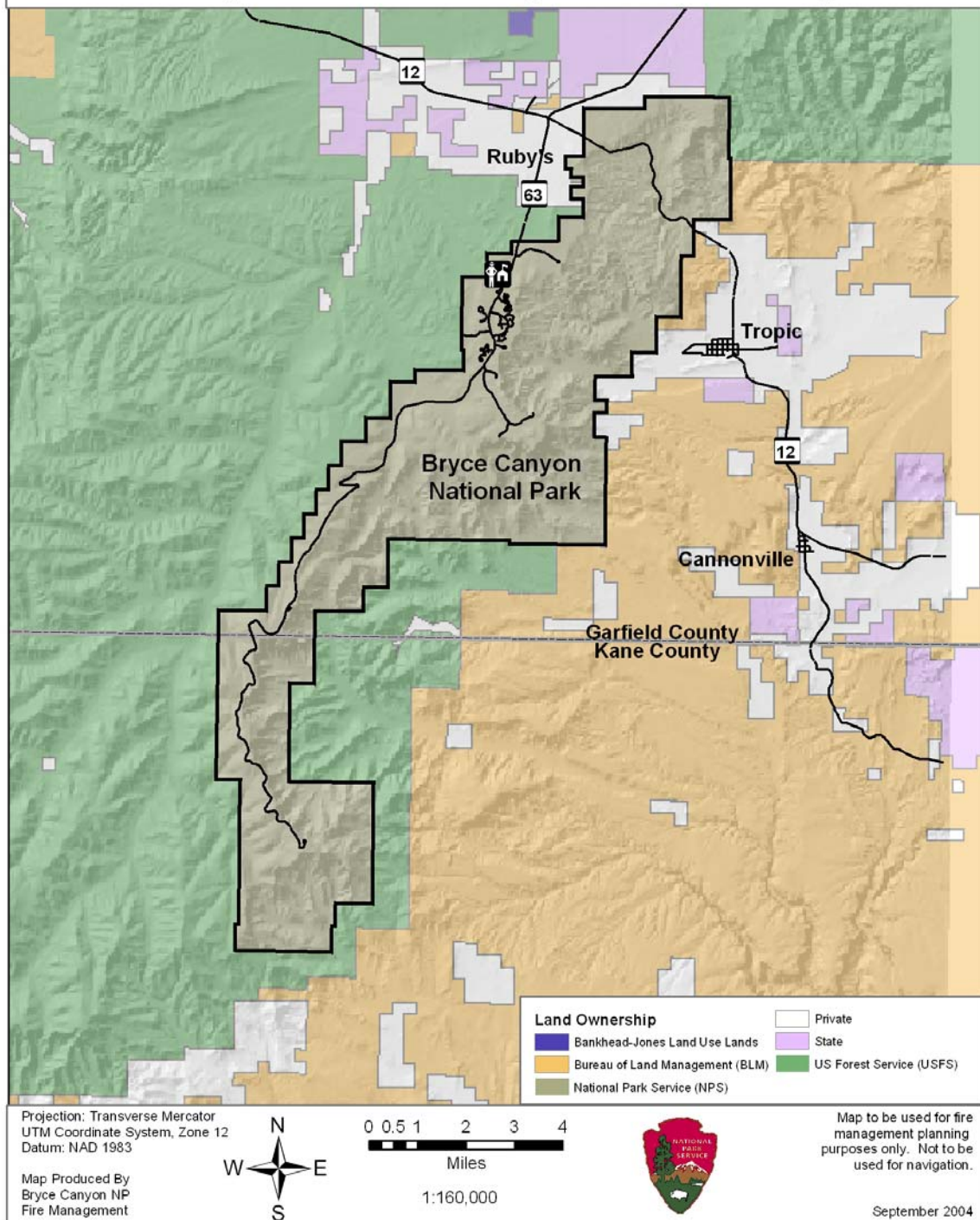
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Map to be used for fire
management planning
purposes only. Not to be
used for navigation.

September 2004

Map B: Surrounding Land Ownership



Historical Perspective of Fire

Land Use History

Based on the existing archaeological record, the area within and surrounding Bryce Canyon has been occupied by humans for over 9,500 years. There is evidence that prehistoric human inhabitants hunted game and gathered native vegetation throughout the area. They later cultivated vegetables to supplement their diet. There is speculation that they used fire to manipulate vegetation during these activities, although no definitive evidence exists. This subject continues to be researched and debated.

In 1776 Fathers Dominguez and Escalante, and in 1841 Osborne Russell (a fur trapper), noted that indigenous people deliberately burned grasslands in central Utah. Also, both the Navajo and the Ute are known to have employed deliberate burning to reduce hazards, and improve the habitat and hunting grounds for game species (Stewart 1953). John Wesley Powell (1879) stated that the primary obstacle to the forests occupying their full potential range in Utah was the frequent fires ignited by Indians.

The Bryce Canyon National Park Wildland Fire Management Plan (1994) describes the arrival of Euro-americans and subsequent fire suppression as:

"After the 1870's the activities of man interrupted the natural fire interval and patterns of burning. Livestock grazing reduced the light fuels that had historically carried fires in the forests and interspersed meadows. Even though there were probably no efforts to control naturally caused fires between the 1870's and early 1900's the frequency of fires and the area burned decreased due to the decrease of perennial grasses, which provided flash fuels.

After 1905 when the Forest Service began managing the forests on the plateau, active fire suppression began in earnest. A full fire suppression policy has continued to the present under the management of the National Park Service. Fire no longer plays the ecological role it once did in the forests of the Paunsaugunt Plateau, particularly in Bryce Canyon National Park."

Documented Wildland Fires

Wildland fires are any non-structural fire, other than a prescribed fire, that occurs in the wildland. This term encompasses fire previously called both wildfire and prescribed natural fire. Records of wildland fire occurrences in the park prior to the 1940s either do not exist or are incomplete. Beginning in 1940, wildland fires were better documented. In 1974, an official database was implemented across the NPS to increase the accuracy of fire documentation.

Over the past 30 years (1973-2003) the park has averaged 4 fires annually. Based on submitted DI-1202 Fire Reports, 122 fires occurred in the park during that time. A fire history summary for the park can be found in Appendix A and is shown on Map C.

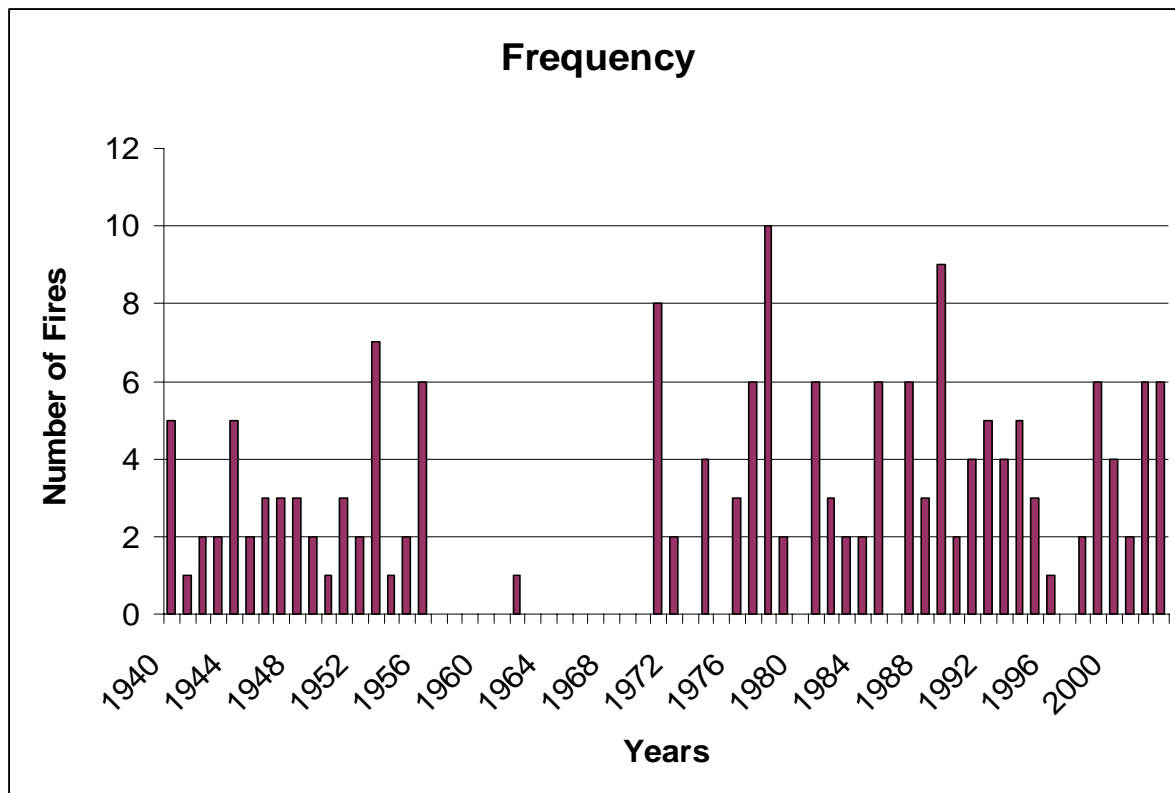
Table 1 summarizes wildland fire activity from 1940 to 2003. Figure 1 displays fire frequency based on all documented wildland fires since 1940.

Table 1: Summary of Wildland Fires 1940 to 2002				
Decade	Total number of fires	Number of ALL fires less than 5 acres	Number of ALL fires greater than 5 acres	Acres of suppressed wildland fire
1940-1949	28	27	1	14
1950-1959*	22	22	0	9

1960-1969 *	1	1	0	0
1970-1979 *	35	35	0	14
1980-1989	37	36	1	17
1990-1999	32	31	1	20
2000-2003	18	17	1	10
TOTAL	174	170	4	81

* Fire records are missing for the period from 1957-1961, and 1963-1970

Figure 1: Fire Frequency Since 1940 (based on completed fire reports)

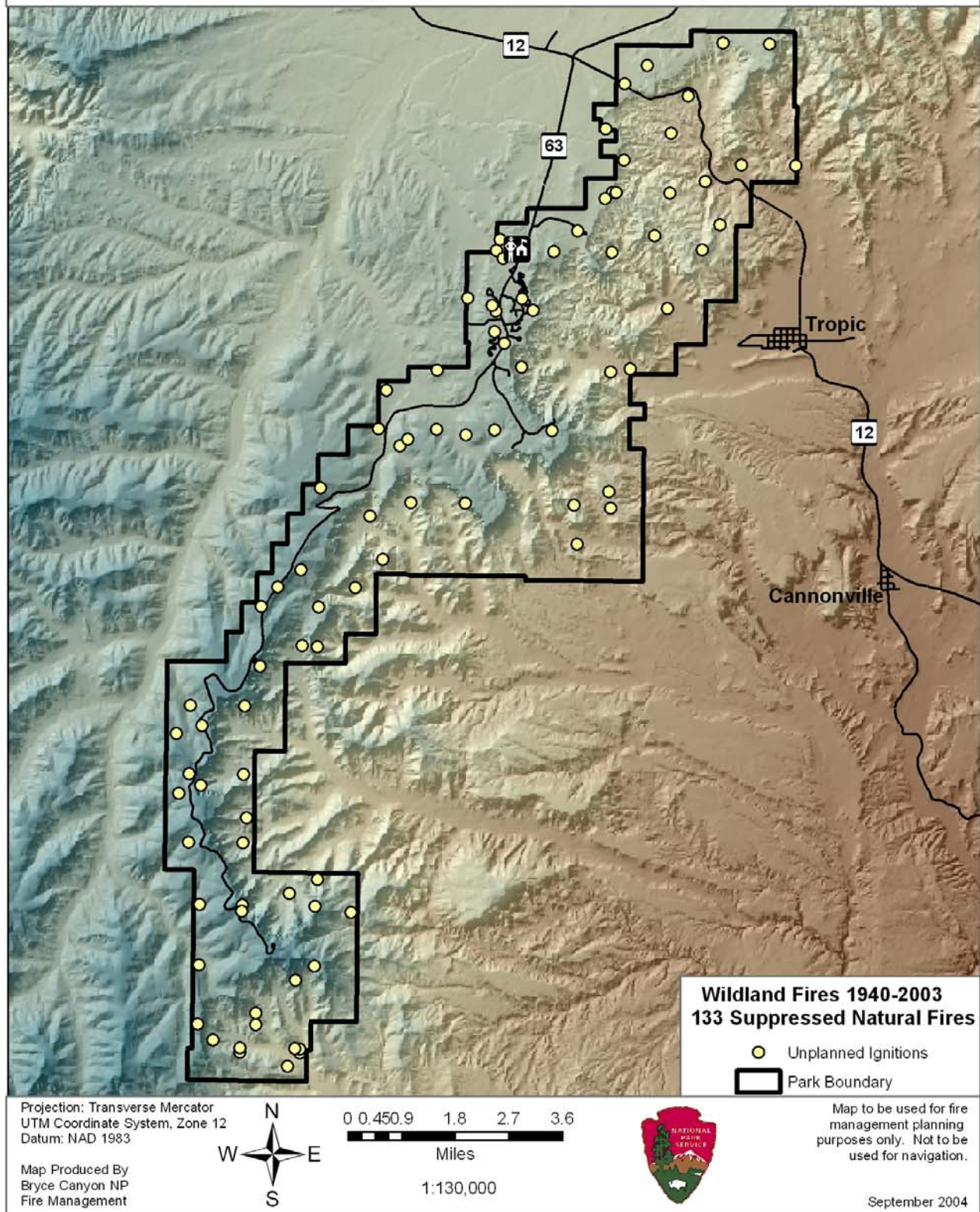


Fire History Studies in the Southwestern United States

The following fire history studies may provide a range of fire frequencies that occurred naturally in vegetation types that are similar to those in Bryce Canyon.

- A Great Basin National Park study conducted in pinyon-juniper woodlands evaluated 32 tree samples. The data showed a complex and variable fire history that largely took place before 1860 and varied considerably depending on aspect, topography, and ignition source. The study found that the fire return intervals ranged from 15 to 53 years in the pinyon-juniper woodlands. This study further showed that the fire frequencies of individual trees varied from 19 to 46 years (Gruell 1994).
- A Mesa Verde National Park study conducted in pinyon-juniper vegetation types found a fire return of approximately 400 years and a fire return interval of approximately 100 years in the petran chaparral community (Floyd et al. 2000).

Map C: Fire History



- The Rito de Los Frijoles group 1 study conducted on the Jemez Mountain Range in northern New Mexico examined 9 samples. When Swetnam and Basin (1996) further analyzed the data, they found an average fire return interval of 7 years in a ponderosa pine/pinyon-juniper forest ranging in elevation from 6,660 to 6,750 feet. This same analysis examined fires that were recorded by 25 percent or more of the trees in the sample and found a fire interval between 8 and 24 years, with an average of 16 years.
- A study conducted at Walnut Canyon National Monument in northern Arizona analyzed 18 tree samples. When Swetnam and Basin (1996) further analyzed the data they found an average fire return interval of 3 years in a ponderosa pine/pinyon-juniper forest ranging in elevation from 6,660 to 6,800 feet. This same analysis looked at fires that were recorded by 25 percent or more of the trees in the sample and found a fire interval between 1 and 12 years, with an average of 6 years.
- The Mesita Blanca study conducted at El Malpais National Monument in central New Mexico evaluated 26 tree samples. When Swetnam and Basin (1996) further analyzed the data, they found an average fire return interval of 8 years in a ponderosa pine/pinyon-juniper forest ranging in elevation from 7,370 to 7,420 feet. This same analysis looked at fires that were recorded by 25 percent or more of the trees in the sample and found a fire interval between 8 and 25 years, with an average of 17 years.

A study conducted on the Chuska Mountain Range in northeastern Arizona on the Navajo Indian Reservation assessed 16 samples. When Swetnam and Basin (1996) further analyzed the data, they found an average fire return interval of 3 years in a ponderosa pine/mixed conifer forest ranging in elevation from 8,800 to 8,900 feet. This same analysis looked at fires that were recorded by 25 percent or more of the trees in the sample and found a fire interval between 2 and 14 years, with an average of 8 years.

Fire History Studies in Southern Utah

Other fire history studies in southwest and south central Utah have been completed. The studies did not compare tree ring data across a larger geographic area, limiting the ability to transpose the data onto other landscapes; however, the following studies provide a range of fire frequencies for the general area near Bryce Canyon.

- A fire history study conducted in the late 1980s in primarily ponderosa pine communities with some Douglas fir on the Paunsaugunt Plateau found that the fire return intervals ranged from 15 to 18 years. Fire frequencies of individual trees varied from 19 to 46 years on a sample of 14 trees (Stein 1988).
- Utah State University researchers West and Loope (1977) cored the largest trees in pinyon-juniper woodlands in Zion National Park to determine the time since the last fire. The average was around 160 years. From this and other evidence, they concluded that fire was too infrequent at lower elevations to warrant detailed research at the time, and that fire was significant only at upper elevations.
- West and Madany (1981) conducted an extensive fire history study at Zion National Park. This study not only researched the fire chronology of the upper elevations of the park, but also discussed the role of indigenous use of fire, livestock grazing, and pioneer (historical recorded accounts by early settlers of the region) and suppression of fire. Combined with fewer Paiute ignitions and fire suppression by settlers, fires were removed from the ecosystem, as the NPS continued fire exclusion in the 1920s.

This study found a fire frequency of 4 to 7 years. Sixty-seven of the 123 sample sections contained pith that could be used to calculate the age at which a tree was first scarred. Sixty-four of the trees were ponderosa pine. The remaining three trees were white fir, Douglas fir, and Rocky Mountain juniper. The research derived from this study area fits into the general pattern for studies in other states for ponderosa pine plant communities. Analysis of fire scars found a fire frequency in 12

watersheds of 2.7 to 25 years prior to European settlement, and fires larger than 960 acres occurred nearly every 3 years prior to 1881.

West and Madany cited the following as part of the Zion fire history study.

Snow (1911) surveyed the area around 1911 and commented, "... soil generally gravelly and rocky, ... but supports an excellent growth of grasses, especially good on the west side of the canon [i.e., Horse Pasture Plateau]. The timber in this township is mostly pinon, yellow pine [ponderosa pine], red pine [Douglas fir], and cedar [juniper]; but is mostly scattering."

Alter (1942) cited a description from Priddy Meek's journal. [This description is of the land to the northeast of Zion.] In June of 1852, Priddy described the area as "... Rich soil, plenty of grass and timber ... so that a team and wagon might be driven any place ... We traveled three days amongst this timber, which is of the best quality and clear of underbrush." Their findings seem to indicate that the conversion of ponderosa pine savanna into forest cannot be attributed mainly to the absence of fire as widely believed, but may be due to a host of factors (Madany and West 1984).

Fire History Studies in Bryce Canyon National Park

Ponderosa Pine and Mixed Conifer Studies

Buchanan and Tolman (1983) studied the dendrochronology in Bryce Canyon National Park and found a pre-settlement fire return interval of 4-7 years. This study evaluated 87 fires from 1616 to 1900 and 6 fires after 1900.

Wight (1989) researched the fire history in forests dominated by ponderosa pine within Bryce Canyon. The research focused primarily from the meadow west of the visitor center to East Creek Meadow, which is south of Sunset Campground. The results of this research showed that fire had been very prevalent in the area.

A total of 75 fires occurred on the 22 trees that were sampled. The master fire chronology for the study area was divided into two eras. The historic era occurred prior to 1900, while the suppression era followed. Fire frequency for the historic period was 3.3 years on a sample of 22 trees, while the fire frequency for the suppression era was 9.9 years on a sample of 4 trees. The period between 1750-1900 was characterized by numerous fires, but after this date the fire frequency declined due to grazing activities of the late 1800's and the initiation of suppression actions. Many of the fires that were recorded on the 22 trees were small and affected only a few of the trees. These small fires were more prevalent on the ridge tops and hillsides, while larger fires were more common along the meadows and toe slopes.

Jenkins' (1995) fire history study of the mixed conifer forests of Bryce Canyon found a fire return interval of 7.5 years prior to the 1900s, with an increase to 45 years since the early 1900s. This study was conducted in the southwest portion of the park. Data were collected on a sample of 20 trees, which recorded a total of 53 fires that encompassed a 400-year time frame.

Historical Fire Regimes and Current Condition Classes

In order to understand the connection of documented wildland fires to that of fire history, it is necessary to understand fire regimes. Fire regimes describe historical fire conditions under which vegetation communities have evolved and have been maintained (Hardy et al. 1998). Fire regimes describe the frequency and severity of fire events in vegetation communities. Fire frequency is the average number of years between fires. Severity is the effect of the fire on the dominant overstory vegetation, which can be forest, shrub, or herbaceous. The current condition class (described below) also must be considered in

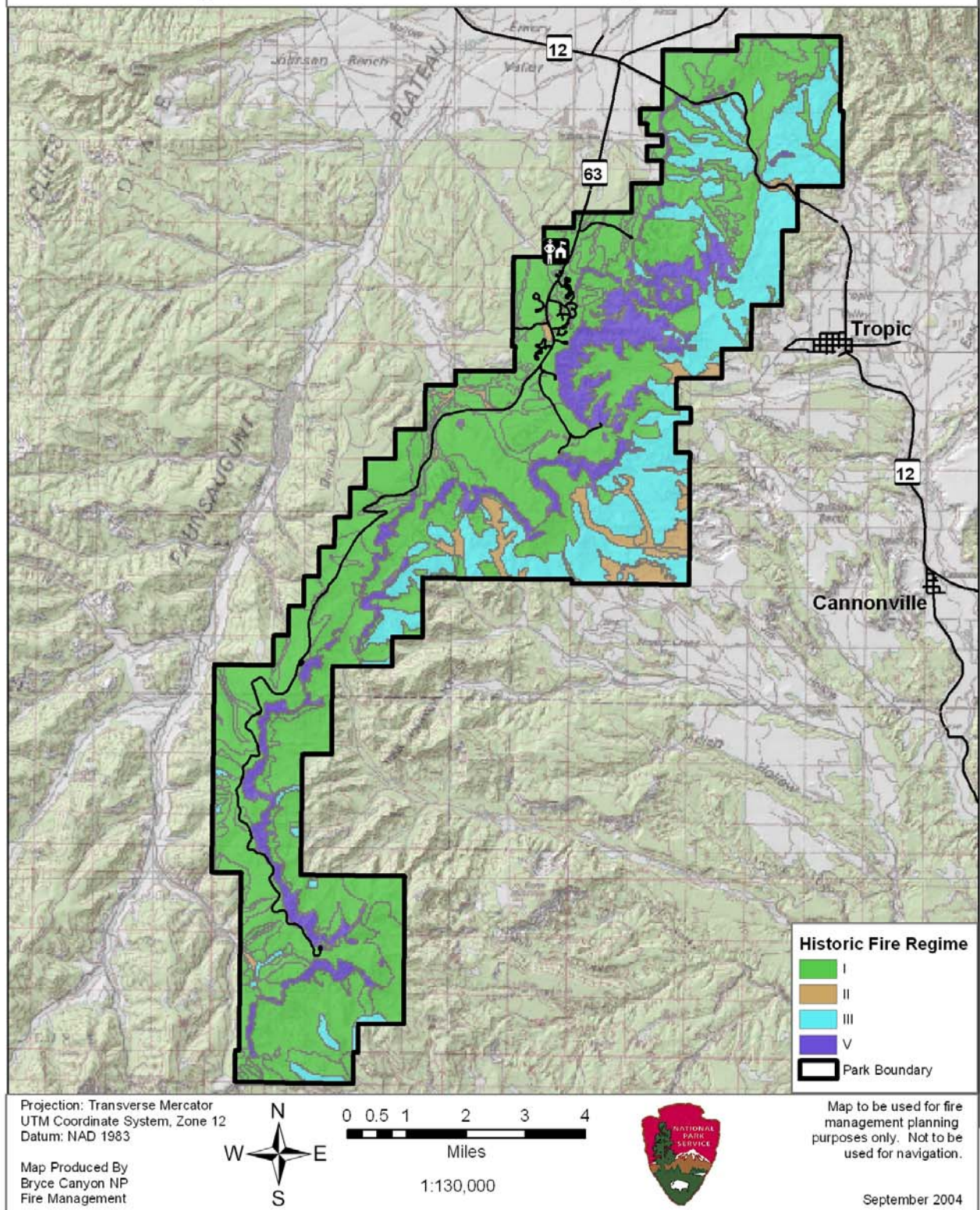
order to understand how these historical fire regimes have been altered through past management practices.

Historical natural fire regime data are not exact reconstructions of historical conditions, being defined as conditions existing before extensive pre-Euro-American settlement (pre-1900), but rather reflect typical fire frequencies and effects that evolved in the absence of fire suppression (Hardy et. al. 1998). This document uses the five regimes as defined by Schmidt et al. (2002) including fire frequency and severity. They modified Heinzelman's (1981) seven fire regimes, which were defined by return interval and fire intensity. Schmidt used a methodology similar to that used by Brown and others (1994), who integrated site characteristics, habitat types, topographic attributes, and vegetation types to map fire regimes. Fire frequency and severity measures were used to determine the departure from historical conditions. One or more activities may have caused this departure: fire exclusion, timber harvesting, livestock grazing, introduction and establishment of non-native plant species, introduced insects and disease, or other management activities. Table 2 describes the classification, fire frequency (fire return interval), severity, and class assumptions for modeling or determining the historical fire regime class. Map D displays the historical fire regimes within Bryce Canyon.

Current condition class is a qualitative measure describing the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, canopy closure, and fuel loadings. Data typically show the degree of departure from historical fire regimes. The classification system includes three current condition classes: 1) fire regimes are within an historical range, and the risk of losing key ecosystem components is low; 2) fire regimes have been moderately altered from their historical range and the risk of losing key ecosystem components is moderate; 3) fire regimes have been significantly altered from their historical range and the risk of losing key ecosystem components is high. Table 3 lists the condition class rating, gives a brief description of the fire regime characteristics, and provides example of management options that may be used in maintaining or restoring landscapes. Map E displays the fire regime condition classes within Bryce Canyon.

Table 2: Historical Fire Regime Class Designation			
Historical Fire Regime Class	Fire Frequency (fire return interval)	Severity	Modeling Assumptions
I	0 – 35+ years, frequent	Surface	Open forest or savannah maintained by frequent fire; also includes frequent mixed severity fires that create mosaic of different age post-fire open forest, early to mid-seral forest structural stages, and shrub or herb dominated patches (generally < 100 acres).
II	0 – 35+ years, frequent	Replacement	Shrub or grasslands maintained or cycled by frequent fire; fires kill non-sprouting shrubs, such as sagebrush, which typically regenerate and become dominant within 10 – 15 years; fires remove tops of sprouting shrubs, such as mesquite or chaparral, which typically re-sprout and dominate within 5 years; fires typically kill most tree regeneration, such as juniper, pinyon pine, ponderosa pine, Douglas-fir, or lodgepole pine.
III	35 – 100+ years, infrequent	Mixed	Mosaic of different age post-fire open forest, early to mid-seral forest structural stages, and shrub or herb dominated patches (generally < 100 acres) maintained or cycled by infrequent fire.
IV	35 – 100+ years, infrequent	Replacement	Large patches (generally > 100 acres) of similar age post-fire shrub or herb dominated structures, or early to mid-seral forest cycled by infrequent fire.
V	> 100 – 200 years, infrequent/rare	Replacement	Large patches (generally > 100 acres) of similar age post-fire shrub or herb dominated structures, or early to mid- to late seral forest cycled by infrequent fire.
(Hann and Bunnell 2001)			

Map D: Historical Fire Regime Classes



Map E: Current Condition Classes

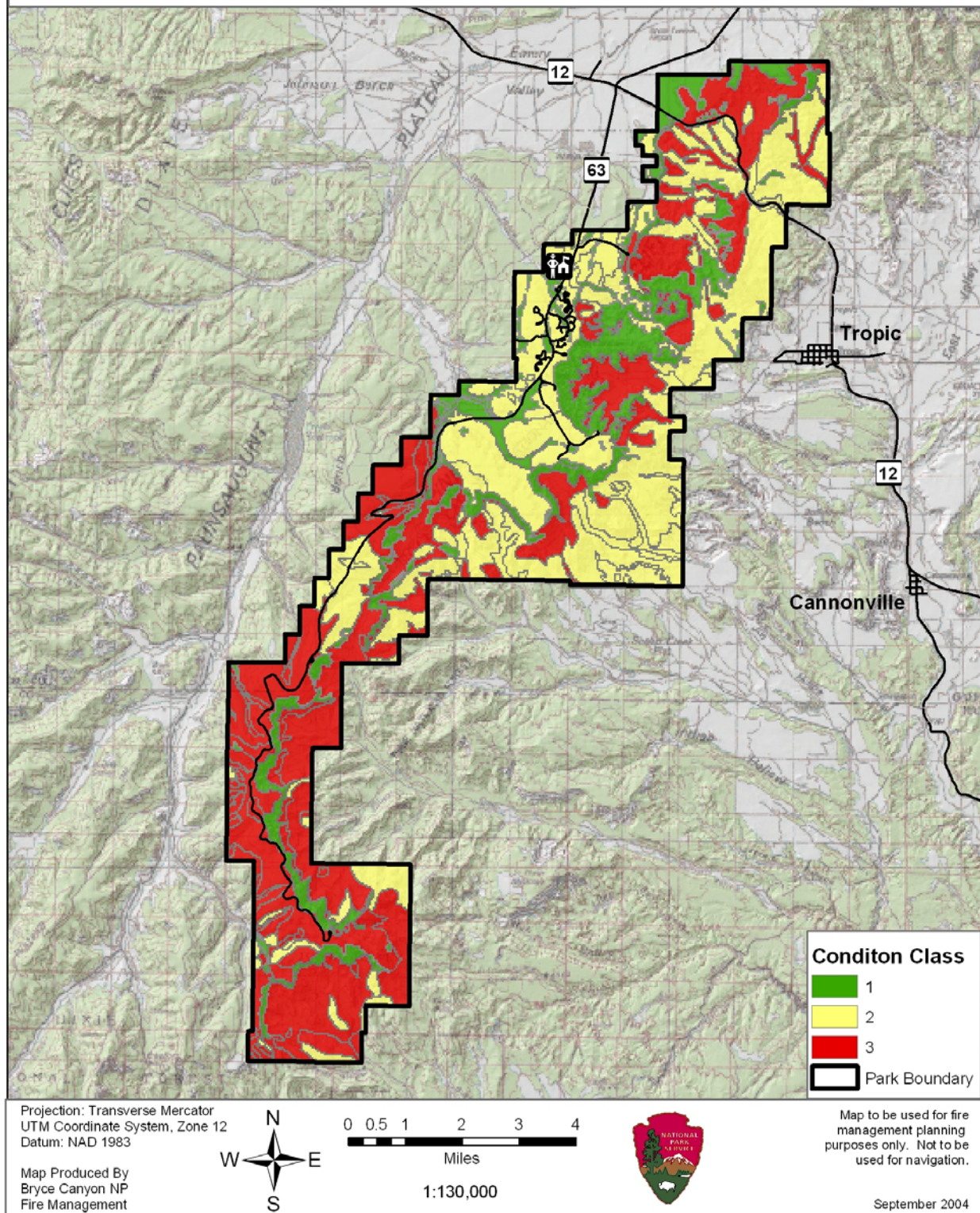


Table 3: Fire Regime Current Condition Class		
Condition Class	Fire Regime	Example Management Options
1	Fire regimes are within historical range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within historical range.	Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.
2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased), resulting in moderate changes to one or more of the following: fire size, intensity and severity, and/or landscape patterns. Vegetation attributes have been moderately altered from their historical range.	Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.
3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals, resulting in dramatic changes to one or more of the following: fire size, intensity, severity, and/or landscape patterns. Vegetation attributes have been significantly altered from their historical range.	Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the historical fire regime.
Fire Regime Current Condition Class is a qualitative measure describing the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components, such as species composition, structural stage, stand age, canopy closure, and fuel loadings. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, livestock grazing, introduction and establishment of non-native plant species, introduced insects or disease, or other management activities (Schmidt, K.M., et. al. 2002).		

Vegetation Communities by Historical Fire Regimes (FR) and Current Condition Class (CC)

The vegetation at Bryce Canyon was mapped through a joint project with the U.S. Bureau of Reclamation, The Nature Conservancy (Nature Serve), and the NPS. Table 4 shows the major vegetation communities by historical fire regime class and current condition class. Table 4 utilizes the vegetation communities described in the *Affected Environment* section, along with the historical fire regime class designation from Table 2. Specific fire history information for some of the vegetation communities at the park has not been developed. The historical fire regime classification is presented here in a general sense to categorize each vegetation type by frequency and severity (refer to the above descriptions of historical fire regime and current condition class).

Table 4: Vegetation Communities by Historical Fire Regime and Current Condition Class			
Vegetation Communities	Historical Fire Regime Class¹	Current Condition Class²	Fire History Assumptions and Notes
White Fir (Mixed Conifer)	I	3	Depending on location, vegetation probably burned within a 7 year time frame as derived from the fire history study. In general, CC 3 with some areas of CC 2.
Basin (Big) Sagebrush (Shrublands)	II	2	FR of II and a CC of 2 as the fire regime has been moderately altered due to suppression activities, grazing influences, and exotic plant introductions.
Breaks (Sparse rim badlands)	V	1	FR V because very infrequent fires with a CC of 1 since fire regime is within historical range.
Caryx rossi (Moist Meadows)	II	1	FR of II and a CC of 1 within historical range and low risk of losing key ecosystem components.
Juniper / Pinyon	<u>III</u> or IV	2	FR of III and a CC of 2 as the fire regime has been moderately altered due to suppression activities, grazing influences, and exotic plant introductions.
Bristlecone Pine	V	1	FR of V and a CC of 1 within historical range and low risk of losing key ecosystem components.
Ponderosa Pine	I	<u>3</u> and 2	Depending on location, vegetation probably burned within the 4 to 7 year time frame as derived from the fire history studies. In general, CC 3 with some areas of CC 2.
Engelmann Spruce	III	1	FR of III and a CC of 1 as the fire regime is within the historical range.
Quaking Aspen	III	3	Depending on location, vegetation probably burned within a 7 year time frame as derived from the fire history study, however a FR of III and a CC of 3 since this type has been significantly altered.
Douglas Fir	I	2	Depending on location, vegetation probably burned within a 7 year time frame as derived from the fire history study. FR of I and a CC of 2 as the fire regime has been moderately altered due to suppression activities.
Gambel Oak	II	2	FR of II and a CC of 2 as the fire regime has been moderately altered due to suppression activities.
Grassland	I	1	FR of I and a CC of 1 within historical range and low risk of losing key ecosystem components.
Stream	V	1	FR V with infrequent fires with a CC of 1 (minor exotic plant introductions - Tamarisk and Russian Olive).
<p>¹Underlined FR or CC roman numerals or numbers (ex. <u>II</u>) indicate most of the vegetation falls within this FR or CC.</p> <p>²Historical fire regime and current condition class for each vegetation type was determined using expert knowledge and experience with these vegetation types. The fire effects information system also provided insight into vegetation characteristics and responses related to fire. Since the vegetation types were combined for a common vegetation description, many of the classifications for fire regime and condition class encompassed large cross-sections of specific vegetation descriptions. At this level, some of these classifications are at a very coarse scale. Refined work is needed on these historical fire regimes and current condition classes. The national direction is to map these classifications at the landscape scale (6th code watershed) with plot assessments sampled on the ground and a secondary level is to classify historical fire regime and current condition class by detailed vegetation maps.</p> <p>(Hann and Bunnell 2001; Schmidt, K.M., et. al. 2002; USDA, 2004)</p>			

Legislative History

Bryce Canyon National Park was originally established as a National Monument by Presidential Proclamation No. 1664 on June 8, 1923, that stated in part:

“Whereas, certain lands within the Powell National Forest in the State of Utah, known as Bryce Canyon, are of unusual scenic beauty, scientific interest and importance, and it appears that the public interest will be promoted by reserving these areas with as much land as may be necessary for the proper protection thereof as a national monument.”

On June 7, 1924, provisional legislation was passed to establish Utah National Park for the benefit and enjoyment of the people. However, the provisions were not met until after February 25, 1928, when the name Utah National Park was legislatively changed to Bryce Canyon National Park. The park was officially established September 15, 1928 as Bryce Canyon National Park. In 1931, a proclamation adding lands to Bryce Canyon National Park was signed, stating:

“Whereas it appears that the public interests would be promoted by including such lands within said park for the preservation of their natural state and outstanding scenic features and for road protection purposes.”

Lands adjacent to the park were identified as having outstanding scenic values as early as 1924 when a congressional report stated:

“...the attractiveness of the canyon is a sublime spectacle viewed as a panorama from certain points of vantage...”

An act signed in 1930 adding lands to the existing park stated the purpose to be:

“...preserving in their natural state the outstanding scenic features to the south and west of Bryce Canyon National Park.”

The park currently contains 35,835 acres. In order to comply with the enabling legislative language, “...including such lands within said park for the preservation of their natural state...”, fire must be utilized as a management tool. Appendix B contains the enabling legislation for Bryce Canyon.

Significance and Mission Goals

The significance and mission goals of Bryce Canyon are key elements that helped shape the management of the park, including the fire management program. Significance addresses why the park is unique – the cultural heritage and natural features. The mission goals articulate the ideal future conditions the NPS is trying to attain.

Bryce is significant for the following reasons:

- Bryce Canyon has exceptional scenic qualities. Colorful and intricately carved rock formations, vast panoramas of cliffs and canyons, forests and meadows, and clean, high-quality air combine to form one of the finest spectacles to be found in the United States.
- The park provides a variety of opportunities to visitors, especially those seeking solitude.
- The park exhibits unique geomorphology and sedimentology of scientific interest, which are well illustrated by the park’s landforms.
- The park has a wide variety of biologic communities and archaeological resources.

Mission goals of Bryce Canyon are to:

- Be the recognized leader in the preservation of the natural and cultural heritage of the United States by providing the highest quality protection of those resources.
- Provide an outstanding quality of service that engenders understanding, appreciation, and support by our visitors for the values we protect.
- Build an environment that stimulates interest, commitment, quality, productivity, and unity of purpose among employees, while reflecting the ethnic/cultural diversity of the region.

Relationship to Other Plans

The actions proposed in this document are consistent with the *Bryce Canyon General Management Plan* (GMP) (1987), which call for the development of “a fire management program for the park to facilitate the protection and maintenance of the natural environment....” Additionally, the *Bryce Canyon National Park Resource Management Plan* (RMP) (1996) states “...the reintroduction of fire is of vital necessity for the forest health” and “efforts to both use and monitor its impacts is of paramount importance.”

The following plans were identified as being relevant to the development of this Environmental Assessment:

- *Cedar City District Wildland Fire Management Plan*, July 26, 1999, Bureau of Land Management, Cedar City District. The plan encompasses all BLM lands surrounding Bryce Canyon National Park.
- *Utah Code – Title 65A – Chapter 08 – Management of Forest Lands and Fire Control and Rule R652-120. Wildland Fire*, effective January 1, 2004, Utah State Legislature. The plan covers State of Utah lands adjacent to Bryce Canyon National Park.
- *Dixie National Forest Fire Management Plan*, May 2003. This plan covers all forest lands surrounding Bryce Canyon National Park.
- *Evacuation and Road Closure Plan*, August 2002, signed by Color Country Fire Management Officers.

Laws, Policies, and Authorities

The following regulations and guidance documents relate directly to the completion of the Fire Management Plan and this Environmental Assessment.

National Environmental Policy Act (NEPA) – The purpose of NEPA is to encourage productive and enjoyable harmony between humans and the environment; to promote efforts that will prevent or eliminate damage to the environment and stimulate the health and welfare of mankind; and to enrich the understanding of the ecological systems and natural resources important to the Nation. NEPA requirements are satisfied by successful completion of an Environmental Assessment (EA) or Environmental Impact Statement (EIS), in addition to a decision document.

Director’s Order-12 (DO-12) – DO-12 is the NPS guidance for Conservation Planning, Environmental Impact Analysis, and Decision Making. DO-12 outlines the guidelines for implementing NEPA according to NPS regulations. DO-12 meets all Council on Environmental Quality (CEQ) regulations for implementing NEPA.

NPS Organic Act 1916 – Congress directed the U.S. Department of the Interior and the NPS to manage units “to conserve the scenery and the natural and historic objects and the wild life therein and to provide

for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (16 USC § 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the NPS must conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress (16 USC § 1 a-1).

Director’s Order-18 (DO-18) – DO-18 is the NPS guidance for Wildland Fire Management, which states that “every NPS unit with burnable vegetation must have an approved Fire Management Plan.” DO-18 defines what an approved FMP must include, stressing that “firefighter and public safety is the first priority” and promoting “an interagency approach to managing fires on an ecosystem basis across agency boundaries.” Procedures for completion, review, approval, and required contents for FMPs are provided in Reference Manual-18 (RM-18). Until an FMP is approved, NPS units must take an aggressive suppression action on all wildland fires.

Review and Update of the 1995 Federal Wildland Fire Management Policy (2001) – provides guidance and updates for federal fire managers.

Interim Air Quality Policy on Wildland and Prescribed Fires (Environmental Protection Agency) (1998) – provides guidance for mitigating air pollution impacts caused by fires in the wildlands and wildland urban interface.

In addition to the regulations and orders listed above, other regulations and policies guide the assessment of impacts. These are listed below:

- **NPS Management Policies (2001)** – defines how the National Park Service will meet its park management responsibilities under the 1916 NPS Organic Act.
- **Federal Clean Air Act and Amendments of 1990** – includes national ambient air quality criteria; states that federal land managers have an affirmative responsibility to protect air quality-related values from adverse impacts.
- **Utah Air Quality Regulations** – provides protection for air quality related values.
- **Clean Water Act/Regulations** – provides national recommended ambient water quality criteria and calls for no degradation of the nation’s surface waters.
- **Utah Water Quality Regulations** – conserves waters of the state to protect, maintain, and improve water quality.
- **Executive Order 11990** – provides for the protection of wetlands.
- **Executive Order 11988** – provides for the protection of floodplains.
- **Clean Water Act and Section 404 Regulations** – provides for the protection of wetlands and waters of the United States.
- **Endangered Species Act/Section 7** – provides for the listing and protection of endangered and threatened species and their critical habitat; requires consultation under Section 7 if any listed species may be adversely affected.
- **Wilderness Act of 1964** – states that wilderness areas shall be administered for the use and enjoyment of all people in a manner that will leave them unimpaired for future use and enjoyment as wilderness. Sixty-two percent of Bryce is classified as proposed wilderness to reflect the park’s wilderness recommendation.
- **NPS Director’s Order-47** – states that proposed wilderness areas are to be managed to preserve their wilderness character and values.
- **National Historic Preservation Act (NHPA)/Section 106** – provides for the identification and protection of historic sites and structures.

- **Archeological Resource Protection Act** – provides for the protection of archeological resources on public lands.
- **Executive Order 13007** – provides for protection of Indian sacred sites.
- **NPS Director’s Order-28** – defines how the NPS will protect and manage cultural resources on NPS lands in accordance with the NPS Management Policies.
- **NPS Director’s Order-77** –offers guidance to NPS employees responsible for managing, conserving, and protecting natural resources and includes information on prescribed fire management.
-

Goals of the Fire Management Plan

The following goals have been identified to guide the fire management program for Bryce Canyon:

- Ensure that firefighter and public safety is the first priority in every fire management activity and that these activities comply with established fire-safe management practices.
- Prevent and suppress unwanted fires using effective strategies and methods under the decision process of sound risk management.
- Allow for naturally ignited wildland fires to function within their role as an essential ecological process and natural agent of change in maintaining and restoring vegetation communities.
- Use prescribed fire treatments as a naturally functioning process and to achieve vegetation management objectives that support land and resource management plans.
- Document and analyze both short-term and long-term fire effects data in evaluating the effectiveness of fire activities in meeting program objectives and developing scientifically-based management decisions.
- Promote understanding and acceptance of the natural role of wildland fire in maintaining and restoring ecosystem function through a proactive public education program.
- Participate, contact, coordinate, and cooperate in interagency programs (federal, tribal, state and local agencies) as part of the essential process in developing agreements, standardizing policies/procedures, and increasing cross-boundary programs.

Desired Future Conditions

In managing and restoring the ecological benefits of fire on the landscape, managers must understand the differences between current conditions and desired future conditions (DFC). Managers must also understand the practices and environmental factors that contributed to the current conditions.

Ayn Shilsky (2003) summarizes the benefits of identifying desired future conditions:

Building a common vision starts with broad goals for a landscape project, but broad goals don’t help us determine what to do, where, and when. Desired future conditions include broad goals and spatially explicit assessments of current and reference conditions. Landscape scale descriptions of desired future conditions provide the context for determining integrated finer-scale (i.e., stand) priorities and strategies for fire management, fuel treatment, fire regime restoration, and related resource issues.

James M. Vose (2000) highlights the importance of an ecosystem perspective:

Fire is a potentially powerful tool for achieving desired conditions of forest ecosystems. The departure of current ecosystem conditions from desired ecosystem conditions (defined by structural and functional characteristics) depends on the history of land use and disturbance. The disturbance history also influences the rate of attainment of desired conditions and the magnitude of ecosystem process response. Hence, from an ecosystem perspective, managers

must understand the interactions among land use history, current conditions, and desired conditions.

A number of federal laws and NPS policies and practices helped guide the development of desired conditions for resources potentially affected by fire management activities. It is important to recognize that further work is needed at Bryce Canyon to better understand the interrelationships within natural systems. As this occurs, desired conditions may be refined as part of adaptive management. This could be accomplished at the landscape or vegetation community scale and could be useful in developing ecological models and refining ecosystem priorities. Desired future condition statements for each affected resource are described below.

Air Quality

- Fire management activities are consistent with the Utah Smoke Management Plan and State Implementation Plan (in development).
- Smoke emissions do not cause unhealthy air quality conditions or exceed National Ambient Air Quality Standards in surrounding areas.
- Fire management activities minimize the aesthetic impacts of smoke on the airshed in Bryce Canyon.
- Emissions from fires inside the park are managed to minimize impacts beyond park boundaries, through joint planning and implementation with adjacent agencies with jurisdiction.

Vegetation

- Fire processes in fire dependent/adapted vegetation communities are managed to promote healthy and functional ecosystems. Vegetation succession reflects the natural range of variability under conditions that would occur under historical fire regimes.
- Fire is used as a tool to protect and enhance native vegetation communities.
- Fire program operations do not contribute to the spread of invasive weeds in Bryce Canyon.
- Coordination with Resource Management occurs in developing native seed sources.

Water Quality and Hydrology

- Water quality and flow, from surface and groundwater, reflect the full range of natural conditions that would occur under a natural fire regime. Some aspects of water quality and flow are influenced by fire patterns, such as discharge, sediment transport, nutrient flushing, and flood magnitude.
- Water quality is consistent with state standards developed under the Clean Water Act and is not adversely affected by fire operations.

Natural Soundscapes

- Visitors have opportunities throughout the park to experience natural sounds in an unimpaired condition.
- Disruption for essential fire operations is temporary and limited in scope, time, and area.
- The natural soundscape is conserved during fire management activities.

Wilderness

- Wilderness values are maintained or enhanced through fire management activities.
- Wilderness values (i.e., preservation of natural conditions, outstanding opportunities for solitude, primitive and unconfined recreational experience, preserved and used in an unimpaired condition) are protected while conducting fire management activities. Signs of human activity remain substantially unnoticeable.

Wildlife

- Native wildlife habitat is maintained, restored, or enhanced through fire management practices that are consistent with natural processes.
- Fire is used as a tool to prevent unnatural catastrophic fires, resulting from high fuel loads and denser vegetation that may adversely affect wildlife habitat.

Cultural Resources

- During natural or prescribed ignitions, fire management operations are specifically designed to protect and/or enhance cultural resource integrity, scientific research potential, and interpretive value.
- Fire management staff collaborates with appropriate Resource Management staff to seek information and technical expertise for the purpose of identifying cultural resource preservation and protection needs.

Visitor Experience

- A safe visitor experience is provided throughout fire management activities.
- Information is provided to visitors on the ecological, social, cultural, and aesthetic values of fire.

Park Partners

- Through knowledge and understanding, local and tribal governments, park neighbors, state, interagency cooperators, and the public work collaboratively with the park to implement the fire management program objectives and foster a spirit of cooperation.

Issues and Impact Topics Analyzed in Detail

An issue describes a relationship between an action and an environmental resource. Issues associated with proposed fire management activities were identified through internal and external scoping. Internal scoping included an interdisciplinary team with a member representing each affected division and resource group within the park (refer to the *List of Preparers* in the *Consultation and Coordination* section of this document). External scoping was accomplished through various means, including workshops and an informational newsletter (refer to *Consultation and Coordination* section of this document). Through issue identification, impact topics (resource categories) were also identified. The impact topics are listed below followed by an issue statement. Each impact topic is described in the *Affected Environment* section and is analyzed in the *Environmental Consequences* section.

Air Quality

- Emissions from fires could reduce air quality below federal, state, or local air quality standards.
- Emissions from fires could affect air quality in adjacent communities.

Sensitive, Threatened or Endangered Animal and Plant Species

- Fire could affect species or alter habitat for these species.

Soils

- Fire of varying intensities could alter the physical, chemical, and biological properties of the soil as a result of vegetation removal, consumption of organics, and increased temperatures.
- The lack of fire could alter the physical, chemical, and biological properties of the soil as a result of interrupted nutrients cycling in fire maintained habitat types.

Vegetation

- Fire affects the productivity and composition of vegetation communities.
- As a result of fire exclusion, some habitats are currently characterized by more dense growth. This has also led to fuel accumulations that have contributed to an ever-increasing large and severe wildland fire problem in these otherwise fire dependent and tolerant vegetation types.
- Plant communities not tolerant or not adapted to fire may be susceptible to detrimental fire effects from increases in invasive non-native plant species that could become established after fire.
- Fire may influence the spread of invasive non-native plant species.

Water Quality and Hydrology

- Bare, burned slopes would be subject to runoff during rainfall events, which could result in sedimentation and nutrient loading to streams. This could degrade water quality below federal, state, or local water quality standards.

Wetlands

- Fire could affect riparian or wetland vegetation, decrease stream shading, and result in chemical changes for macroinvertebrates.

Natural Soundscapes

- Fire management activities include the use of equipment that would generate noise, which could impact the natural soundscape.

Wilderness

- Fire management activities could affect wilderness experiences and values.

Wildlife

- Fire could affect habitat for wildlife and fisheries.
- Fire could result in direct mortality of wildlife species.

Cultural Resources

- Fire or fire-related activities could affect cultural resources.

Economic Considerations

- Fire or smoke from fires could alter the socioeconomics of the local area due to changes in visitation.
- Fire activities could provide additional income to the local area.

Public Health and Safety

- Fire could be dangerous or present risks to the health, safety, life, or property of firefighters, NPS employees, and the general public.

Visitor Use and Experience

- Fires could prevent visitors from experiencing or enjoying all or part of the park and adjacent areas.

Issues Considered and Dismissed from Further Consideration

The following issues were eliminated from further analysis for the reasons stated below.

Floodplains

No floodplain functions would be affected by fire or fire management activities proposed in this plan. Wetlands that may be located in or near floodplains are addressed under the Vegetation and Wetlands topic.

Park Operations

Park operations were dismissed for further review since implementation of either action requires the same level of assistance from other federal and state agencies. This would allow park operations to continue during fire management activities, and neither alternative would have substantial adverse or beneficial impacts to park operations.

Ecologically Critical Areas

No Ecologically critical areas are known in or near the park. The breaks may be considered as critical areas of the park; however, they do not burn due to lack of vegetation to carry fire.

Prime and Unique Farmlands Lands

No prime and unique farmlands occur in the park or the near vicinity.

Energy Requirements/Depletable Resource Requirements and Conservation Potential

None of the alternatives would affect energy depletable resource requirements or conservation potential to the extent that detailed analysis would be required.

Environmental Justice

None of the alternatives would have a disproportionate health or environmental effect on minorities and/or low-income populations and communities.

Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by the U.S. Department of the Interior agencies be explicitly addressed in environmental documents. No Indian trust resources occur within the park. The lands comprising Bryce Canyon is not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, Indian trust resources were dismissed as an impact topic.

Sustainability and Long-term Management

Aspects of this topic are covered under several other topics that address long-term management objectives and impacts in relation to fire management activities that would occur under the environmental assessment alternatives.

Sustainability is the result achieved by doing things in ways that do not compromise the environment or its capacity to provide for present and future generations. Sustainable practices minimize the short and long-term environmental impacts of development and other activities through resource conservation, recycling, waste minimization, and the use of energy-efficient and ecologically responsible materials and techniques.

Water Uses and Water Rights

None of the alternatives would affect water uses or water rights to the extent that detailed analysis would be required.

Evacuation Plans for Areas Adjacent to the Park

Preparing evacuation plans for private lands adjacent to the park was dismissed from further analysis in this document because these areas fall under the jurisdiction of the State of Utah. This responsibility falls under the jurisdiction of the County Sheriffs in coordination with the Utah Division of Forestry, Fire, and

State Lands and the County Commissioners. The development of an evacuation plan would be coordinated through the County fire wardens and State and County law enforcement agencies. Bryce Canyon personnel would assist with adjacent area coordination and planning.